

# **Design, Implementation & Analysis of Innovation Surveys**

*With a note on presenting results*

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Survey design and implementation Tampere 200

# Outline

## *Part 1*

- How to present survey results for publication

## *Part 2: How to run a survey*

2. Introduction & survey options
3. Questionnaire design
4. Survey methodology

## A. Publishing your survey results

- Methodological information
  - Your reader must know how you conducted your survey, if the results are representative, and for what type of firms (universities, etc).
- Response rates
- Non response analysis
- Questionnaire details
- Research question

# A.1 Methodological information

## 1. Target Population

- Fully define your target population
  - All firms in the software sector in Shanghai with between 20 and 249 employees as of January, 2007.
  - All manufacturing firms in Beijing and Shanghai with over 10,000 employees as of January, 2007.

# A.1 Methodological information

## 2. Protocol

- Time of survey (January – April 2008)
- Protocol basics – number of follow-ups, use of (plus number) of telephone calls, etc.
  - You must convince the reader that all firms had an equal chance of responding and that you made every effort to maximize your response rates.

## A.2 Response rates

- Number of firms contacted
- Number of firms that replied, including ‘moved’ etc.
- Crude plus adjusted response rates
- Sampling information
  - fraction for a sample,
  - census information if relevant,
  - split sample/census?
- Were results weighted to account for differences in sampling fractions?

## A.3 Non response analysis

- Did you conduct a non-response analysis?
  - Not needed if response rate  $> 80\%$
- Type of non-response analysis
  - Based on data collected **before** survey
    - Differences between respondents and non-respondents by firm size, location, sector, etc.
  - Based on a non-response survey
    - Differences by key questions between respondents & non respondents
  - Are descriptive or econometric results weighted to adjust for non-response biases?

## A.4 Questionnaire

- Give an accurate translation of all questions used in the analysis – put in an annex.
  - *Very rare for more than 10 or 20 questions to be used.*
- Give the reference period for the questions:
  - Patent application data: refers to 2005 to 2007 or to 2007 only?



## A.5 Research question

- Keep your literature review short and focused on your research questions.
- Limit the number of your research questions!
  - *A focused analysis on one or two questions is much more interesting, publishable and useful than providing all of your results.*
- Interpret the significance of your results, especially for policy.

## A.5 Research question

- For an international journal, avoid research questions about the effect of firm size, sector, ownership, or supplier-customer links on innovative status or activities.
  - *No longer of much interest*

# **Part B**

## **How to conduct a survey**

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# 1. Introduction

This presentation explains how to design a survey to obtain innovation (and other) data.

- Useful references:
  - Appendix A, Guidelines for the Design of Survey Innovation Indicators, Report 3 of IDEA paper series.
  - **Salant P, Dillman D. How to conduct your own survey. John Wiley and Sons, 1994.**

## ***The essentials***

- If you can avoid conducting your own survey, do so!
- If you must conduct a survey:
  - If your interest is changing the world:

**A well-designed survey with simple analyses is more powerful than advanced statistics applied to poor quality data.**

## 1.2 Survey options

### 1. Structured questionnaire survey (30 – 100,000 firms):

- 1. Mailed Surveys
- 2. CATI (Computer-Assisted Telephone Interviews)
- 3. Fax surveys
- 4. Face-to-face interviews
- 5. Email (**not** yet recommended by itself)

### 2. Semi-structured questionnaire survey:

- Face to face interviews (10 – 100 firms)

### 3. Case studies:

- In-depth interviews with several people within a firms (1 – 10 firms)

# ***Structured versus semi-structured***

|   |        |        |
|---|--------|--------|
| What was the <b>total</b> amount of license income received by your firm from your intellectual property? | _____€ | _____€ |
| Approximately what percentage of this license income was from patents?                                    | _____% | _____% |

## **Semi-structured question:**

What factors influence the amount of license income that your firm receives from specific forms of IPR, such as patents, copyright, material transfer agreements, or confidentiality agreements?

## 1.3 Which method to choose?

|                               | Advantages  | Disadvantages  |
|-------------------------------|---|--|
| <b>Structured survey</b>      | <ul style="list-style-type: none"><li>• Generalize to target population</li><li>• Provide indicators</li></ul>        | <ul style="list-style-type: none"><li>• No insights from respondents</li><li>• Can ask wrong questions</li></ul>   |
| <b>Semi-structured survey</b> | <ul style="list-style-type: none"><li>• Can obtain insights, especially on <i>why</i> firms do what they do</li></ul> | <ul style="list-style-type: none"><li>• Small scale due to costs limits generalisability</li></ul>                 |
| <b>Case studies</b>           | <ul style="list-style-type: none"><li>• In-depth insights</li><li>• Provide ideas for testing in surveys</li></ul>    | <ul style="list-style-type: none"><li>• Not applicable to population</li><li>• Often no comparison group</li></ul> |



## 1.4 Combining methods

1. Case studies to identify *problems*.
2. Structured survey to provide *representative data* on your population of firms.
3. Semi-structured survey to obtain insights on *why* firms do what they do – ie. choose specific innovation strategies.
  1. A semi-structured survey rarely collects numerical data and is therefore not very useful for building econometric models.

## ***A note on semi-structured surveys***

- The design of a survey is similar for a semi-structured and a structured survey
  - - same attention to research questions, questionnaire design, etc
- BUT: some aspects of a structured survey are not relevant.

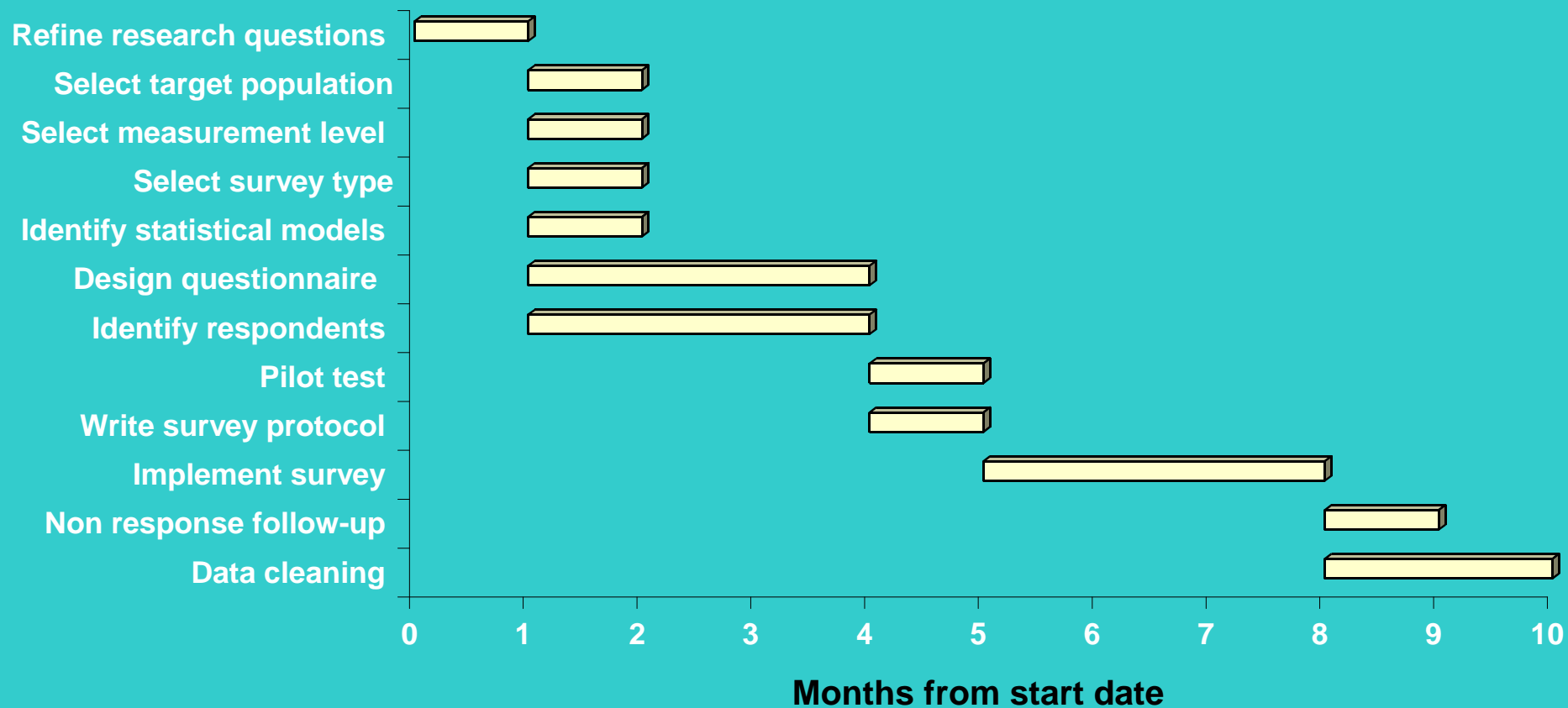
## 1.5 Main steps for a structured survey

1. **Refine your research questions**
2. Identify target population
3. Select measurement level for your variables
4. Select the type of survey
5. Identify appropriate statistical models
6. **Design Questionnaire**
7. Pilot test your questionnaire
8. Identify respondents and select sample frame
9. Write up a protocol and set up a data capture system
10. **Implement survey**
11. Non response analysis
12. Data cleaning
13. **Statistical analysis**

## 1.5a Steps for a **semi-structured survey**

1. **Refine your research questions**
2. Identify target population
3. **Design Questionnaire**
4. Pilot test your questionnaire
5. Identify respondents and select sample frame
6. **Implement survey**
7. **Qualitative analysis**

## Timeline for mailed innovation survey



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## 1.6 Two most important survey goals

Obtain **accurate** and **useful** data for answering your research questions.

- There is often a trade-off between accuracy and usefulness.
- Both require a high response rate.

## ***A note on response rates***

“Our response rate of 14.6% was acceptable for a survey of this type.”

“The response rate of 18.4% was higher than most surveys on this topic, attesting to the high quality of the results.”

This is not enough – you must prove that the low response rate did not bias your results.

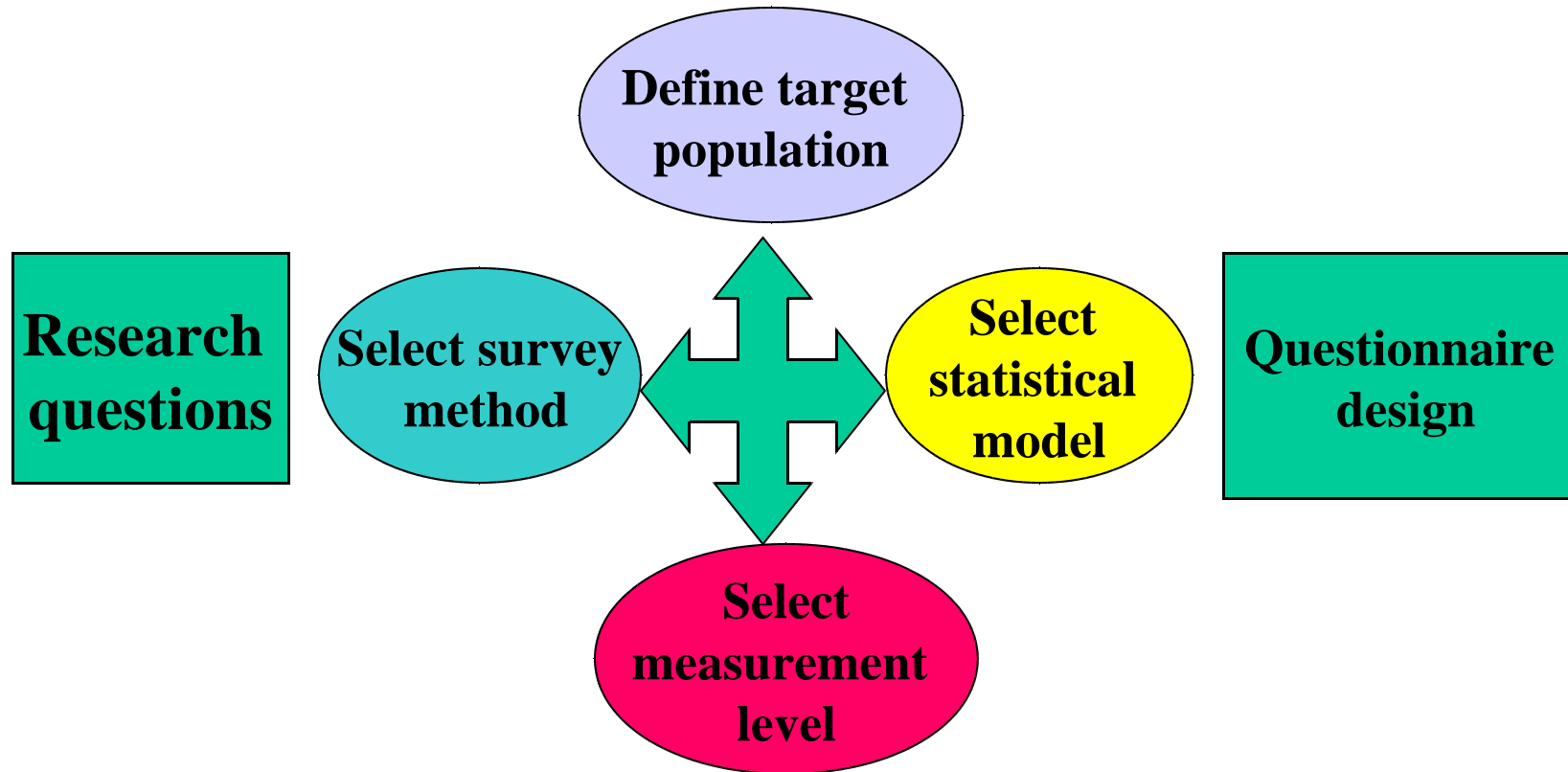
## *more on response rates*

- Generally, with low response rates your results can be seriously biased, meaning:
  - You can't provide point estimates
  - Descriptive results could be meaningless
  - You can use regression to search for patterns, but the coefficients (and marginal effects) cannot be extrapolated to the general population.



## **2. Designing a questionnaire**

# Managing the design process



## 2.1 Evaluate your research questions

## 2.1.1 Is a survey useful?

- Can your research questions be answered using a structured questionnaire survey?
  1. Can the necessary data be obtained through a structured survey – will your questions be understood by the respondent?
  2. Can you accept nominal and scalar data?
  3. Can you accept cross-sectional data?

**If 'no' to any of the above, either alter your research questions or do not use a structured questionnaire.**

## 2.1.2 Question limitations

- Very difficult questions for respondents:
  - **Economic theory**
    - technological opportunity
    - tacit knowledge
  - **Interval level questions**
    - Patent counts
    - R&D expenditures
    - Number of employees with a science PhD
  - **Historical data**
    - Employment in 2000, 2002, 2004....

## 2.1.3 Suitable survey questions

Questions that are short and can be answered by 'yes' or 'no', or through simple response categories:

- Did your firm apply for at least one patent in the last year?
  - If yes:
    - How many patents did your firm apply for in the last year?
      - 1
      - 2-5
      - Over five

***Structured one-off questionnaire surveys are only useful when:***

1. Mostly nominal and ordinal data needed.
2. Only a few interval variables needed.
3. **All** questions can be understood by **all** survey respondents.
4. Time series data are not needed.

## 2.1.4 Identify your data needs

- Before you start, make up mock tables of the results you want to present:
  - Descriptive tables (cross-tabulations, frequencies, etc)
  - Write out your regression models to define and identify ALL of your variables



## 2.1.6 Goals for defining data needs

- EVERY question is of use:
  - Otherwise, you may ask 5 pages of questions that you will never use.
- NO essential data are forgotten:
  - Very expensive to collect missing data later.
- Collect ALL necessary data for your research questions without collecting unnecessary data.

# ***A note on questionnaire length***

- All major research questions for a PhD can be addressed in a **4 page questionnaire** with lots of blank space.
- If your questionnaire is going to be longer, you have too many research questions, or you have not thought through what you need.

## 2.2 Defining the target population

## 2.2.1 Target population

- Usually companies at the enterprise level, but can include research labs, universities, hospitals, the ‘innovation’, or individuals.
  - Enterprise: smallest legally-defined unit of a company.

## 2.2.2 Questions must be suitable for the target population

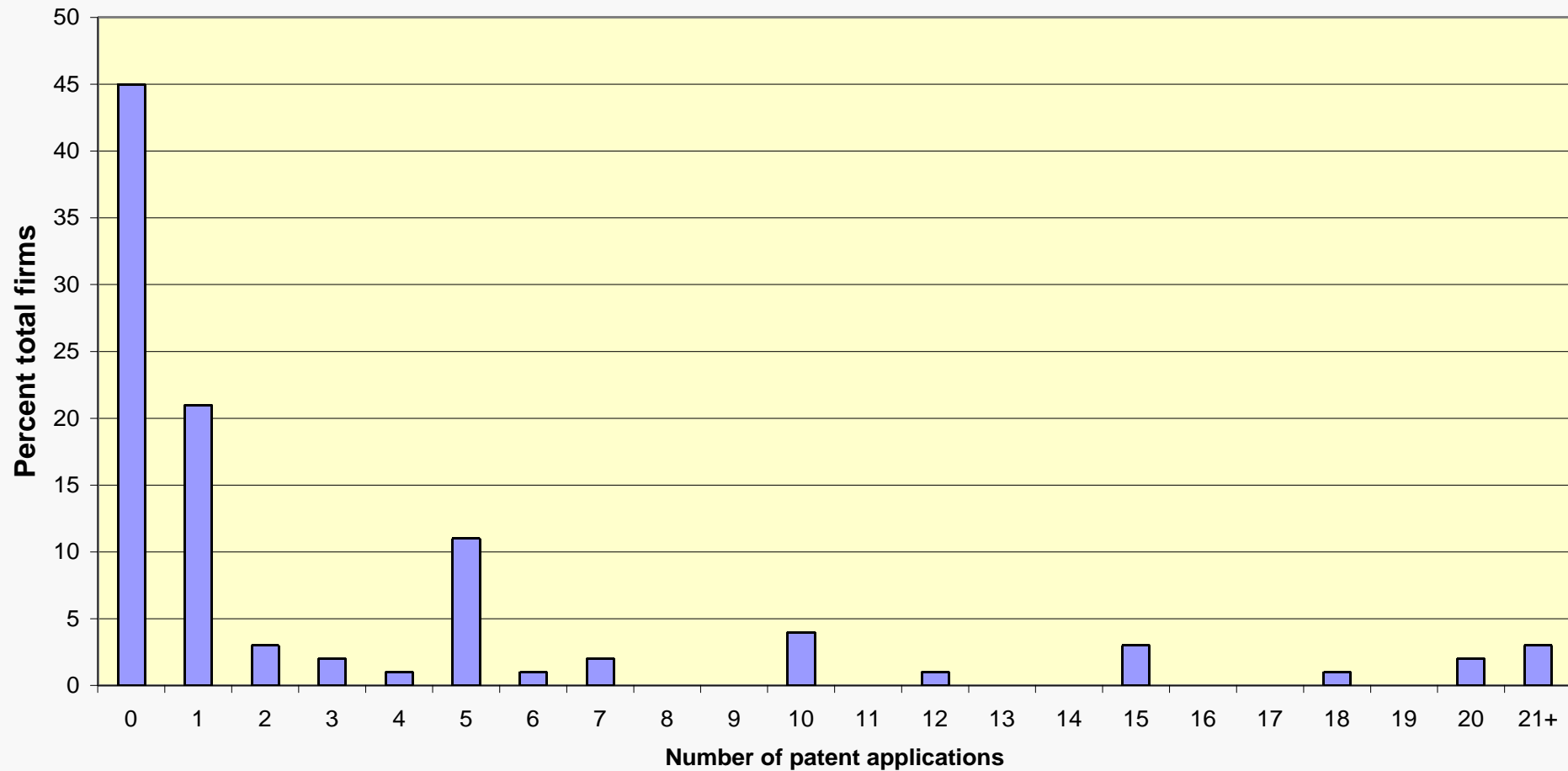
- If your target population includes substantially different units (small and very large firms, low and high tech firms):
  - Your questions must be relevant and answerable by all types of respondents.
  - Or, you need to use separate questions for different types of firms. This will affect your research questions.

## 2.3 Measurement level

## 2.3.1 Interval to nominal shift

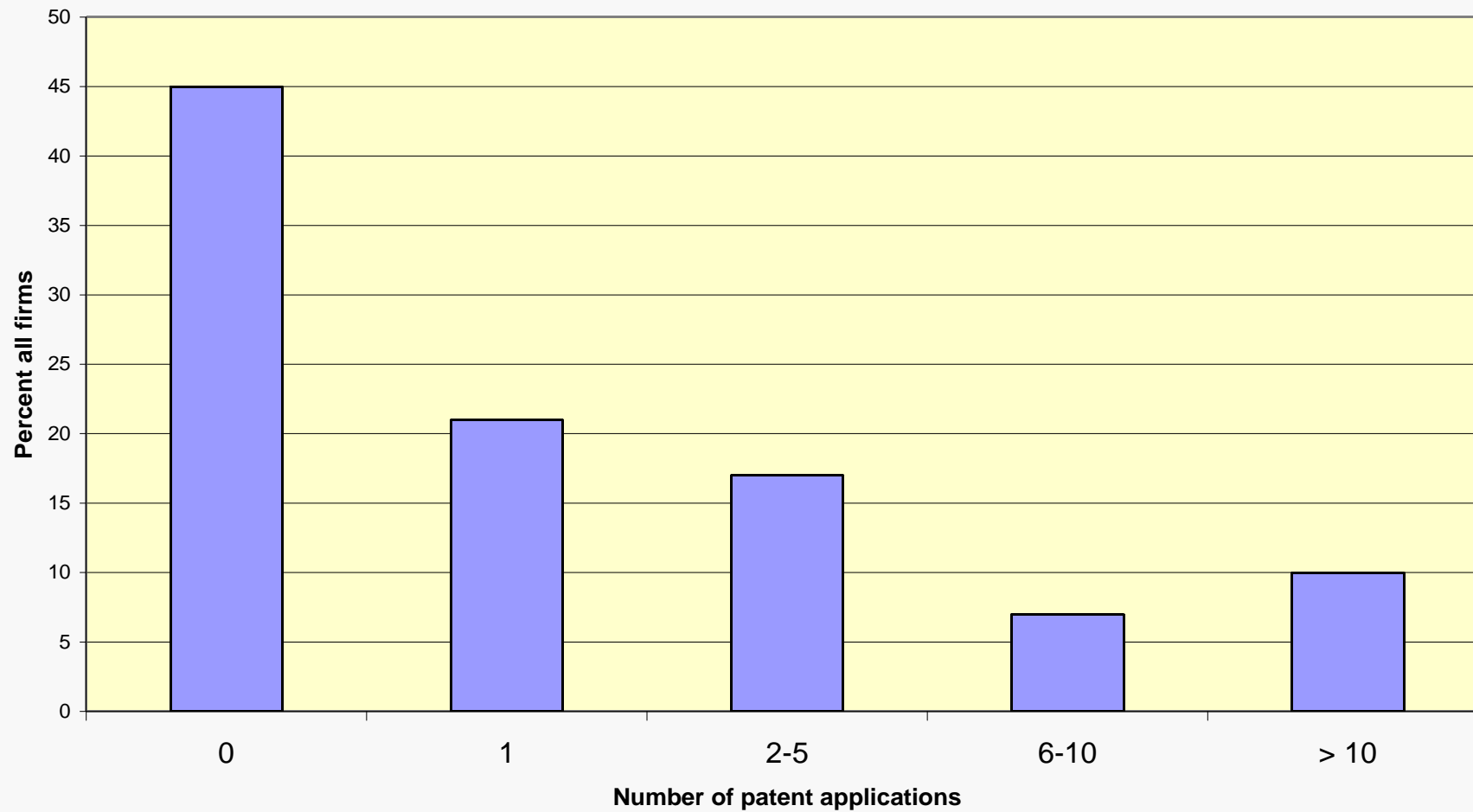
- Many variables that can be measured on an interval scale are measured instead on a **ordinal or nominal** scale.
- Why?
  - Need to make the questions simpler in order to reduce response burden and thereby increase response rates.
  - An interval scale for many questions may not increase accuracy by much – for instance, patent count data.

### 1. Distribution of responses on the number of patent applications





## 2. Patent applications by categories



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## 2.3.2 Category dimensions

- Where to put the boundary between adjacent categories?
- Patent example:
  - 0, 1, 2-5, 6-10, over 10?
  - 0, 1- 9, 10 – 24, 25+?
- Best choice of dimensions will depend on the characteristics of your target population.
  - Need to pilot test your questionnaire!

## 2.3.3 Nominal or ordinal questions?

Nominal (yes or no) questions:

- Advantage from avoiding subjectivity.
- Disadvantage is they are not much use if factor widespread.
  - Little information value to find out that 95% of your respondents use secrecy to protect their innovations from copying.

# Nominal example

**Did your firm use the following methods to prevent competitors from copying your innovations?**

|           | <b>Yes</b>               | <b>No</b>                |
|-----------|--------------------------|--------------------------|
| Patents   | <input type="checkbox"/> | <input type="checkbox"/> |
| Secrecy   | <input type="checkbox"/> | <input type="checkbox"/> |
| Copyright | <input type="checkbox"/> | <input type="checkbox"/> |

## Ordinal example (combined nominal-ordinal)

| How effective were each of the following methods of preventing competitors from copying your innovations? |                          |                          |                          |                          |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
|   | Not used                 | Slightly effective       | Moderately effective     | Highly effective         |
| Patents   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Secrecy   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Copyright   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

## 2.3.4 Which measurement scale to use?

- Expected frequency of activity.
- Requirements of your research questions.
- Need to avoid subjective responses.

## 2.4 Survey Method

## 2.4.1 Mailed, faxed, CATI, face-to-face?

Decision based on:

- Cost.
- Accuracy of the responses.
  - Face-to-face interviews can produce *more* or *less* accurate results – varies by country.
- Required measurement level.
- Expected unit response rates – varies by country.  
(Percent of firms that receive the questionnaire that reply)
- Types of questions that you need.



| Method              | Comments  | Cost                  | Response rates | Max. length                   |
|---------------------|---|-----------------------|----------------|-------------------------------|
| <b>Fax</b>          | Questions should be very simple so that the entire survey can be completed in less than 5 minutes.<br>Very useful for identifying firms to interview  | Cheapest              | 70% - 90%      | 2 pages                       |
| <b>Mail</b>         | Slightly more complex questions are acceptable, best format for matrix questions  | Moderate              | 40% - 60%      | 8 pages                       |
| <b>Phone (CATI)</b> | Rapid response time, immediate entry into a database<br><br>Questions must be simple: they are only 'heard'. They must be carefully designed so that the entire question is properly read out.<br><br>Requires trained and motivated interviewers | Moderate to Expensive | 20% - 80%      | 20 minutes (less than mailed) |

## 2.4.1 What can be asked

- Matrix questions are difficult to ask using a CATI format.
- Fax questionnaires (highest response rates) are limited to a maximum of two pages and should mostly use nominal questions.

# Matrix question example

**6.3 Please indicate the type of co-operation partner and location**  
*apply)*

*(Tick all that*

| Type of co-operation partner                                  | Province                 | Other<br>China*          | United<br>States         |
|---|--------------------------|--------------------------|--------------------------|
| A. Other enterprises within your enterprise group             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| B. Suppliers of equipment, materials, components, or software | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| C. Clients or customers                                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| D. Competitors or other enterprises in your sector            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| E. Consultants, commercial labs, or private R&D institutes    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| F. Universities or other higher education institutions        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| G. Government or public research institutes                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

# ***CATI version*** *(read aloud)*

1. Did your firm collaborate with another enterprise within your enterprise group that was located in your province?

With another enterprise within your enterprise group that was located elsewhere in China?

With another enterprise within your enterprise group that was located outside of China?

2. Did your firm collaborate with suppliers of equipment, materials, components or software that were located in your province?

With suppliers of equipment, materials, components or software that were located elsewhere in China?

With suppliers of equipment, materials, components or software that was located outside of China?

ETC....

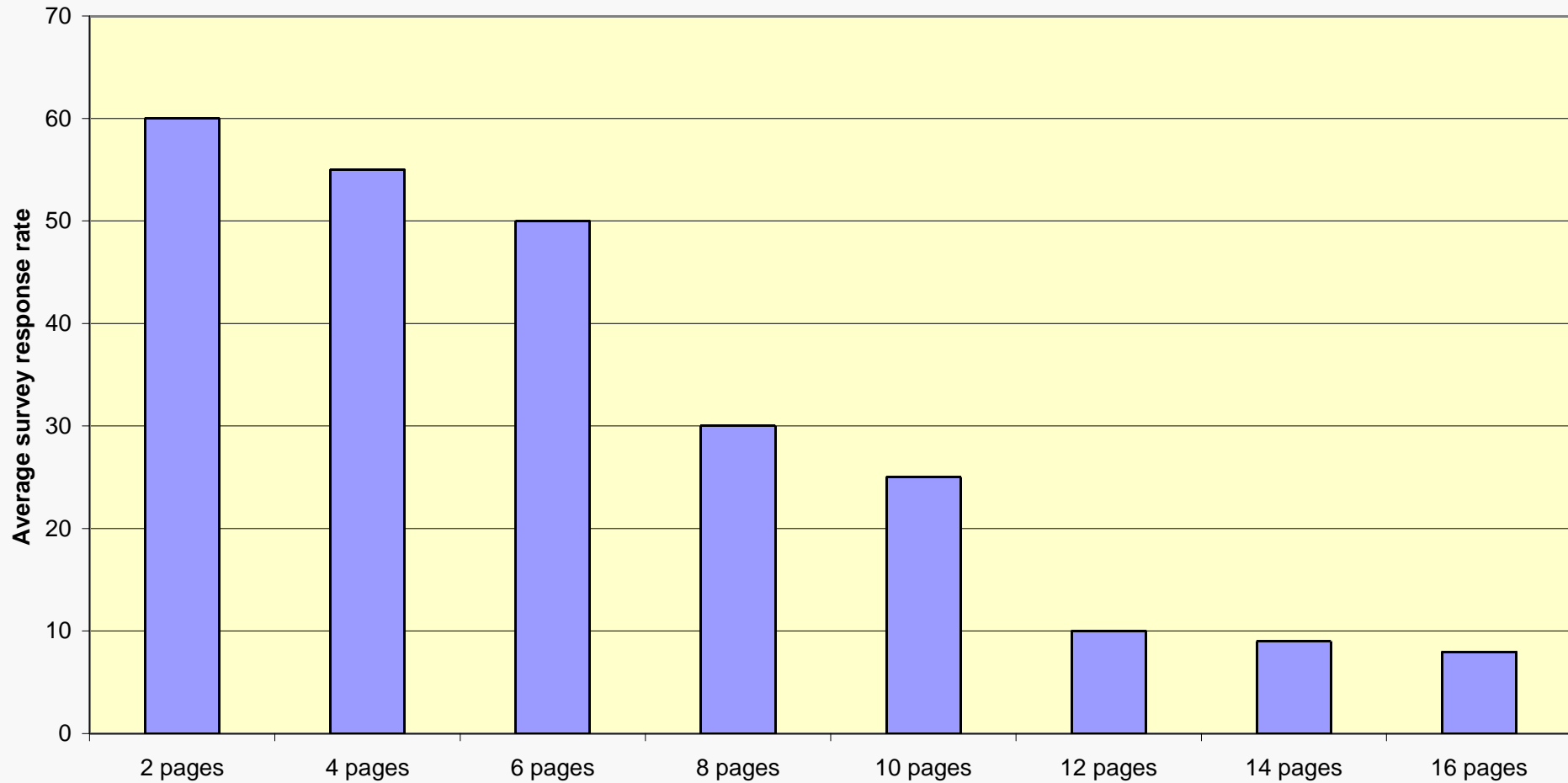
## 2.6 Designing the questionnaire

## 2.6.1 The basics

- It takes a LONG time: weeks or months.
- One person cannot detect all problems – exploit your friends and faculty advisors.
- You MUST field test the questionnaire.
  - Face-to-face interviews
  - Minimum of ten interviews

# ***Short is best..***

**Approximate mailed questionnaire response rates by page length**



# Layout is important: not this!

Please note that all questions refer to your firm. If your firm is active in more than one product or service line, *please answer all questions for the product or service line for which you are responsible.*

1. According to our information, the *main business* of your firm is: \_\_\_\_\_

☐ This is correct  
☐ No, our *main business* is \_\_\_\_\_

2. In the last three years, has your firm developed or improved each of the following types of software? *Please tick all that apply*

☐ Software incorporated into machinery, instruments or other equipment  
☐ Packaged software  
☐ Customized software  
☐ Software for in-house use only  
☐ No software was developed or improved in the last three years (please go to question x)

3. How much of the competitive advantage of your products or services is due to software developed by your firm?

☐ None ☐ A little ☐ A lot ☐ All

4. In the last three years, has your firm relied on Free or Open Source Software for each of the following software products? *Tick 'not relevant' if your firm does not develop a type of software*

|   | No                       | Some                     | A lot                    | Not relevant             |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| Software incorporated into machinery, etc | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Packaged software                         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Customized software                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Software for in-house use only            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

5. On average, how frequently does your firm:

|  | 6 months                 | At least every 6 months to 1 year | 1 to 3 years             | > 3 years                |
|--|--------------------------|-----------------------------------|--------------------------|--------------------------|
| Make a significant improvement to the software in an existing product or service | <input type="checkbox"/> | <input type="checkbox"/>          | <input type="checkbox"/> | <input type="checkbox"/> |
| Introduce an entirely new software product or service                            | <input type="checkbox"/> | <input type="checkbox"/>          | <input type="checkbox"/> | <input type="checkbox"/> |

6. On average, how long does it take your competitors to market a significantly improved version of your firm's innovative software products or services?

☐ less than six months ☐ six months to one year  
☐ 1 to 2 years ☐ 2 to 5 years ☐ Over 5 years

7. How important are the following methods for profiting from your software innovations?

|  | Not important            | Slightly important       | Moderately important     | Very important           |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| First to publish: journal or software repository | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| First to market                                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Patenting the software                           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Patenting the hardware containing the software   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Trade secrecy                                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Technical protection measures                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Trademarks/marketing                             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Copyright  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

8. How important to your firm are the following sources of ideas for your software innovations?

|  | Not important            | Slightly important       | Moderately important     | Very important           |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| Products on the market                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Software source code in other products | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Journals                               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Patent databases (published patents)   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Other (Internet forums, etc)           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |



## ***But this...***

**1. Is your office responsible for some or all of the patenting, licensing, or other technology transfer activities of a:** *(check all that apply)*

- ☐ University
- ☐ Hospital (linked to a university or independent)
- ☐ Government or non profit research institute
- ☐ Research park or incubator affiliated with a university, hospital, or research institute.
- ☐ None of the above *(Go to question 11)*

**2. Is your office responsible for all patenting and licensing by the institution(s) checked in question 1?** *(Hereafter referred to as 'your' institution)*

- ☐ Yes *(go to question 3)*
- ☐ No      Approximately what percentage of all patent applications by your institution was handled by your office in 2004-2005? \_\_\_\_\_%

## 2.6.2 Seven main rules for questions

1. Use simple but unambiguous language.
2. Do not cut corners to save space.
3. Each question must not overlap with others.
4. Check for logical errors.
5. Only one question per question! Place filter questions separately.
6. Build definitions into the question.
7. Anchor your responses when possible.

# *Logical errors*

**Figure A.5: Question logic**

What was your firm's domestic and world-wide sales in 1996:

|            |       | Don't Know               |
|------------|-------|--------------------------|
| Domestic   | _____ | <input type="checkbox"/> |
| World-wide | _____ | <input type="checkbox"/> |

# ***Definitions in the question***

A process innovation is the implementation of a **new** or **significantly** improved production process, distribution method, or support activity for your goods or services. The innovation (new or improved) must be new to your enterprise, but it does not need to be new to your sector or market. It does not matter if the innovation was originally developed by your enterprise or by other enterprises. Exclude purely organisational innovations.

## **3.1 During the three years 2002 to 2004, did your enterprise introduce:**

|  | Yes                      | No                       |
|--|--------------------------|--------------------------|
| New or significantly improved methods of manufacturing or producing goods or services  | <input type="checkbox"/> | <input type="checkbox"/> |
| New or significantly improved logistics, delivery or distribution methods for your inputs, goods or services   | <input type="checkbox"/> | <input type="checkbox"/> |
| New or significantly improved supporting activities for your processes, such as maintenance systems or operations for purchasing, accounting, or computing | <input type="checkbox"/> | <input type="checkbox"/> |

# 3. Survey Methodology

1. Survey implementation
2. Non response analysis
3. Data capture and cleaning

## 3.1 Survey Implementation

1. Random sample or census
2. Data requirements for your sample
3. Survey protocol

## 3.1.1 Sampling frame

- The *sampling frame* includes the target population and that fraction of the population that is included in the survey.
- A *census* surveys all of the target group.
- A *sample* surveys a part of the target group.
  - Can use a random or stratified-random sampling method.
- The sampling frame for many innovation surveys uses a census for large firms (over 250 employees) and a sample for smaller firms.

## 3.1.2 Random sample or census?

The answer depends on:

- How much money you have
- Size of target population
- Your expected survey response rate
- Sampling power (may not be relevant)



- Only a few hundred firms: survey them all
- A few thousand or more: select a random sample
- In between:
  - Reduce target population and survey them all
    - Firms with more than 50 employees
  - Increase your target population

**It is easier to survey an entire population than to take a sample**

### 3.1.3 Data requirements

- For both a sample or census, you will need information on:
  - Number of employees of each firm
  - Sector of activity
  - Other information that you may use for sampling
- For a sample, you will also need to determine the sampling fraction
  - Percent of all firms in a cell (defined by size, sector, country etc) that you will sample
  - The sampling fraction is used in analysis to weight the results to represent the entire population

### 3.1.4 Before you start: vital information for all *respondents*

- Firm name
- Name of the person who you want to receive the questionnaire
- Contact information: phone, fax number, address

**Do not bother with a survey if you  
can only send the questionnaire to:**

**“The CEO”**

**“The R&D manager”**

**“To whom it may concern”**

### 3.1.5 Survey protocol goals

- Establish rules of survey
- Maximize response rates
- Ensure representative results

### 3.1.6 How to maximize response rates

1. Send questionnaire to an **identified** respondent.
2. **'Personalize'** all contact – signed cover letter, real stamp versus metered postage, hand-written address, etc.
3. Promise to **send a report** to the firm afterwards and do so.
4. Make the **questionnaire interesting** to the respondents – they must see the value of the questions for their own firm.
5. Good **follow-up** routine.
6. **Appropriate survey method** for your target population.
7. **Only ask questions that the respondent can answer.**

## 3.1.7 Pilot survey protocol

- 10 + face-to-face interviews
  - Specialized topic with established interview methods
  - Goal to identify problems with questions, category boundaries, etc

# Cognitive testing example

3. During the three years 2005 to 2007, did your enterprise engage in the following innovation activities:

|                   |   | Yes                      | No                       |
|-------------------|---|--------------------------|--------------------------|
| In-house R&D      | Creative work undertaken within your enterprise to increase the stock of knowledge for developing new and improved products and processes (only include software development that meets this requirement) | <input type="checkbox"/> | <input type="checkbox"/> |
|                   | If yes, did your firm perform R&D during 2006 to 2008:  |                          |                          |
|                   | Continuously (your enterprise has permanent R&D staff)  | <input type="checkbox"/> |                          |
|                   | Occasionally (as needed only)   | <input type="checkbox"/> |                          |
| Industrial design | Industrial design that combines functions in new ways or creates new functions (exclude industrial design activities that are part of R&D)  | <input type="checkbox"/> | <input type="checkbox"/> |

*How do they understand the question on industrial design – ask them to describe it?*

*Do they see industrial design as a separate activity from R&D?*

*Do they do industrial design in-house, or do they contract out this type of work?*

**Oslo & Frascati Manual definitions do not always work.**

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## 3.1.8 Protocol for main survey

- Written instructions for survey; frequency of follow-up, etc.
  - A cover letter to motivate the respondent to reply
  - Offer something in return – usually a report
- Written instructions for non-response protocol
  - Basic questions to determine differences between respondents and non-respondents

## 3.1.9 Common follow-up protocol

- First mail out at time zero:
  - Cover letter: plus confidentiality statement
  - Questionnaire
  - Stamped, return envelope
- Second mail at week 2:
  - Letter only
- Third mail out at week 4:
  - Reminder letter emphasizing importance of survey
  - Another copy of the questionnaire.
- First telephone follow-up call at week 6...

# Example of a cover letter

Logo of organisation  
requesting data



## ASTP Survey 2006

Dear [name],  
[QID]

Motivation

The rapid growth of technology transfer activities in Europe is an undisputed fact. However, a clear picture of the extent of these activities in Europe is still missing.

Convinced of the importance of demonstrating the role of technology professionals and their institutions to this growth, ASTP is conducting a survey on technology transfer. The survey results should help research institutions and technology transfer offices to improve their services and provide benchmarks for future growth.

No cost to them

Please note that your answers will be kept confidential. No data will be released in any form (printed, electronic, verbal, etc.) that could identify you or your research organisation. Please use the enclosed self-addressed and postage-paid envelope to return your completed questionnaire.

Confidentiality  
promised

In recognition of your time and effort in completing the survey, all respondents will receive a summary report of the main results.

Reward for  
responding

For further information

If you are not the appropriate person for responding to this survey, please let us know by sending a short email to Dr. Catalina Bordoy ([c.bordoy@merit.unimaas.nl](mailto:c.bordoy@merit.unimaas.nl)). You may also email or phone Dr. Bordoy at 31 43 388 3702 if you have any questions.

Counting on your essential collaboration to make this 2006 survey a success, we send you our best regards.

Signatures of VIPs

Jeff Skinner

A handwritten signature in blue ink, appearing to read 'J. Skinner', written over a light blue grid background.

President ASTP

Laurent Mieville

A handwritten signature in blue ink, appearing to read 'L. Mieville', written over a light blue grid background.

Vice President ASTP

Survey design and implementation Tampere 2008

### 3.1.9 Protocol & representative results

- You must follow an identical protocol for all firms
  - The probability of responding to the survey must not be biased by the follow-up method.
  - Especially important for random samples – can be ‘bent’ for a census or if expected response rates are very low.
    - Focus on most economically important firms.

## 3.2.1 Non-response (NR) analysis

- Determine if your sample is representative of the population or biased
  - Bias can be a serious problem if differences in the willingness of respondents to reply are related to your key variables.
  - A good non-response analysis is essential if your response rate is low

# Calculating non response rates

|                                       |       |     |
|---------------------------------------|-------|-----|
| Total questionnaires mailed out:      | 1,000 |     |
| Not eligible (wrong size, sector,etc) | 150   |     |
| Moved, out of business etc.           | 50    |     |
| Eligible responses                    | 350   |     |
| Non-responses                         |       | 450 |

Crude RR = 35%  $(350/1,000)*100$

Adjusted RR = 44%  $(350/800)*100$

Maximum RR = 49%  $(350/710)*100$

*For maximum estimated: assume that proportion (20%) of moved/not eligible is the same in the non response group and subtract them (90) from the total.*

### 3.2.2 Rules of thumb for a 'low' response rate

- High: 80% +
  - no non-response analysis generally needed
- Moderate: 50% - 80%
  - Determine if there are statistically significant differences between your respondents and non-respondents by sector, size class, country etc.
- Low: under 50%
  - Both analyse under 'moderate' and run a non-response survey to determine if there are differences between non-respondents and respondents on key questions

### 3.2.3 NR analysis using pre-survey data

- Calculate statistical significance of differences between your respondents and non-respondents:
  - Firm size (number of employees)
  - Sector of activity
  - Region of location
  - Ownership status (public, private, state firm)
  - Etc.



# ***Non-response comparison***

## **Number of Establishments by Employment Size**

### **Georgia Department of Labor (DL) vs. Survey Respondents**

| <b>Employees</b> | <b>DL</b>    |                | <b>Survey</b> |                |
|------------------|--------------|----------------|---------------|----------------|
|                  | <b>Count</b> | <b>Percent</b> | <b>Count</b>  | <b>Percent</b> |
| 10 to 19         | 1,503        | 32%            | 163           | 25%            |
| 20 to 99         | 2,162        | 46%            | 306           | 47%            |
| 100+             | 73           | <b>2%</b>      | 185           | <b>29%</b>     |
|                  |              | 100%           |               | 100%           |

### 3.2.3 Analysis using a NR survey

- Provides better non-response data
- Implement a brief follow-up survey by telephone of non-respondents
  - 3- 4 simple, easy to answer questions
  - Questions **must** be related to your key variables
    - Purchase new manufacturing technology in the last year
    - Apply for a patent
    - Etc.

## ***Sample non-response survey questions***

**1. In the last three years, has your firm developed or improved any software?**

☐ Yes      ☐ No      ☐ (Don't know – do not prompt)

**2. In the last three years, has your firm include free or open-source software code in any of the software developed or improved by your firm?**

☐ Yes      ☐ No      ☐ (Don't know – do not prompt)

**3. Does your firm hold one or more software patents in any jurisdiction?**

☐ Yes      ☐ No      ☐ (Don't know – do not prompt)

### 3.2.4 How many non-respondents to survey?

- No easy answer – the size of the non-response follow-up depends on subjective decisions for what is a meaningful difference between the non-respondents and the respondents.
  - The larger the non-response survey, the easier it is to identify a statistically significant difference in the two groups.
  - Use EPI-INFO or other software to determine the NR survey follow-up size.

## 3.3.1 Data capture and cleaning

- Keep response records in a spreadsheet
- Enter responses into a questionnaire interface
  - SPSS data entry
  - EPI INFO
- Most software comes with data cleaning software to check for logical errors.
- Pay careful attention to accuracy of interval data
  - **Check all outliers for accuracy!**

|  |          |  |
|--|----------|--|
| $V_1, \dots, V_{i-1}, V_{i+1}, \dots, V_n$ | $\Delta$ |  |
|--|----------|--|



ID 163

**1. Is your office responsible for some or all of the patenting, licensing, or other technology transfer**

- ☒ University
- ☒ Hospital
- ☐ Government or non-profit research institute
- ☐ Research park or incubator affiliated with a university,...
- ☐ None of the above (Go to question 11)

**...But this****2. Is your office responsible for all patenting and licensing by the institution(s) checked in question 1?**

- ☒ Yes (go to question 3)
- ☐ No      Approx., what percentage of all patent applications was handled by your office? \_\_\_\_\_ %

**3. Which best describes your office: (Please, select the most appropriate option only)**

- ☒ A technology transfer office that is an integral part of your institution.
- ☐ An external firm or organisation that provides technology transfer services to institutions
- ☐ Other \_\_\_\_\_

# Summary (What you must do)

1. Draw up your tables and research questions in advance – *every question of use*.
2. Cognitive testing of your questionnaire with a minimum of 10 respondents (pilot survey).
3. No more than 6 pages if mailed (with lots of blank space).
4. Send to an identified person by name.
5. Extensive follow-up: 3 mail-outs, 3 telephone calls.
6. Conduct a non-response follow-up.